

REMARKS

With this Amendment, Applicant adds new claims 7-15. No new matter is added.

Therefore, claims 1-15 are all the claims pending in the application.

I. Formal Matters

Applicant thanks the Examiner for acknowledging the claim to foreign priority and for confirming that the certified copy of the priority document was received.

Applicant thanks the Examiner for acknowledging receipt of the Information Disclosure Statement filed January 15, 2002, and for considering the references cited therein.

Applicant thanks the Examiner for indicating his approval of the drawings filed January 15, 2002.

II. Rejection of Claims 1-2 Under 35 U.S.C. § 102(b)

Claims 1-2 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Adachi (U.S. Patent No. 5,151,795; hereinafter “Adachi”). Claim 1 recites:

A method of compressing image signals, comprising the steps of:

i) obtaining a plurality of radiation image signals respectively representing a plurality of radiation images of an object, which radiation images have been formed with several kinds of radiation having different energy distributions,

ii) obtaining an energy subtraction image signal, which has been formed from the plurality of the radiation image signals, and

iii) performing compression processing on the plurality of radiation image signals and the energy subtraction image signal,

wherein the energy subtraction image signal is compressed with a compressibility higher than the compressibility with respect to each of the radiation image signals.

Applicant respectfully submits that Adachi fails to disclose or suggest at least wherein the energy subtraction image signal is compressed with a compressibility higher than the compressibility with respect to each of the radiation image signals, as claimed. In the Office Action, the Examiner cites to column 8, lines 13-15 for the proposition that Adachi discloses this feature of claim 1. Contrary to the Examiner's assertion, neither the cited portion, nor any other portion of Adachi discloses or suggests wherein the energy subtraction image signal is compressed with a compressibility higher than the compressibility with respect to each of the radiation image signals formed by radiation having a different distribution.

Rather, Adachi discloses a system for compressing and extending a masked image (30), and a plurality of subtraction images (34, 35, 36) such that an addition process can be performed to reconstruct corresponding live images (45, 46, 47). (*See Fig. 5 of Adachi; Col. 7, lines 26-28 & Col. 7, lines 46-49*). According to the disclosure of Adachi, subtraction processing is performed on digital image signals representing the masked image (30) and respective live images (31, 32, 33), which results in a plurality of subtraction image signals representing subtraction images (34, 35, 36). (*See Figs. 3 & 5 of Adachi*). During the compression process taught by Adachi, the digital "image signals representing live images" (31, 32, 33) "are not compressed." (*See Col. 6, lines 43-44*) (emphasis added). Instead, the image signals representing the single masked image (30) and the plurality of subtraction images (42, 43, 44) are compressed in a compressor (37). Col. 6, lines 45-48. The compressed image signals are subsequently output to an extender (40) which reproduces a single masked image (41) and subtraction images (42, 43, 44). (Col. 7, lines 13-16). Thereafter, the masked image (41) and each of the subtraction images (42, 43, 44) are subjected to addition processing, which

reconstructs image signals representing live images (45, 46, 47). (*See Fig. 5 of Adachi; Col. 7, lines 23-24 & Col. 7, lines 41-49.*)

Since the live images (45, 46, 47) may be reproduced without compressing the image signals representing the plural live images (Col. 6, lines 43-44), Adachi discloses that the compressibility of “the whole set of image signals can be kept high.” Col. 6, lines 51-55; Col. 7, lines 44-49.

In view of the preceding discussion, the Examiner’s reliance on column 8, lines 13-15 of Adachi does not disclose or suggest an energy subtraction image signal *compressed with a compressibility higher than* the compressibility with respect to each of the radiation image signals formed with different radiation, as claimed. In particular, the cited portion of Adachi relates generally to the manner in which “image signals representing the energy subtraction images [e.g. 34, 35, 36] are compressed.” Col. 7, lines 63-64. For instance, column 7, lines 66-68 and column 8, lines 1-6 describes that live images, such as a high-energy image and a low-energy image “are weighted and subtracted from each other” during a subtraction process, which results in a subtraction image “from which a bone image has been eliminated, and a [subtraction] image, from which a soft tissue image has been eliminated.” Instead of the live images (i.e., the high-energy image and the low-energy image) being compressed, the subtraction images mentioned above are compressed in a compressor, such as compressor (37). Col. 6, lines 43-44. Subsequently, the image signals representing the image from which the bone has been eliminated and the image, from which the soft tissue image has been eliminated (i.e., the subtraction images) are extended by an extender, such as extender (40). Thereafter, the above-mentioned subtraction image signals are weighted and added together during an addition process so as to

reconstruct the live image signals representing the high-energy image and the low-energy image.
(Col. 8, lines 20-22).

As demonstrated above, the cited portion of Adachi merely discloses that the compressibility of the subtraction image signals can be kept high since the image signals representing the live images can be reconstructed without being compressed. Any compression of a single formed image does not correspond to the multiple radiation images as claimed. Adachi is simply altogether silent regarding the matter of compressing image signals at different rates of compression. Moreover, the live images, such as the high-energy image and the low-energy image are not compressed, as suggested by the Examiner. As such, there is simply no disclosure in Adachi suggesting an energy subtraction image signal is compressed with a compressibility higher than the compressibility with respect to each of the radiation image signals, as required by claim 1.

Additionally, in rejecting claim 1, the Examiner relies on column 7, lines 63-65, and column 8, lines 8-9 of Adachi as teaching the requirement for performing compression processing on the plurality of radiation image signals and the energy subtraction image signal, as recited in claim 1. Particularly, the Examiner suggests that the cited portion of Adachi teaches that “the low-energy and high-energy images are radiation images” (taught by Adachi) that are compressed. (*See* pg. 2 of the Office Action). As discussed the above, Adachi teaches that the low-energy image and the high-energy images are live images which are not compressed by compressor (37). Accordingly, Adachi does not disclose or suggest performing compression processing on the plurality of radiation image signals. Moreover, Applicant submits that compression of a single formed image does not correspond to the multiple radiation images as

claimed. Adachi therefore does not disclose, teach, or suggest performing compression processing on the plurality of radiation image signals and the energy subtraction image signal, as required by claim 1.

Given that Adachi fails to each and every element of claim 1, as discussed above, Applicant respectfully requests the Examiner to reconsider and withdraw the § 102(b) rejection of claim 1.

Since claim 2 contains features that are similar to claim 1, Applicant submits that claim 2 is patentable for reasons similar to those submitted for claim 1. To be precise, Adachi fails to disclose or suggest *at least* an apparatus for compressing image signals wherein compression processing is preformed on the plurality of the radiation image signals and the energy subtraction image signal are compressed, as claimed. Adachi also fails to disclose or suggest an apparatus for compressing image signals wherein a compressibility in the second compressing process is higher than the compressibility in the first compressing process, as claimed.

Alternatively, or in addition, Applicant submits that claim 2 is patentable because Adachi fails to disclose or suggest an apparatus for compressing image signals wherein the apparatus comprises, *inter alia*, a *radiation image signal compressing means* for performing compression processing on each of the radiation image signals with a *first compression process*, and an *energy subtraction image signal compressing means* for performing compression processing on the energy subtraction image signal with a *second compression process*, as claimed. In the Office Action, the Examiner appears to suggest that the X-ray image recording apparatus shown in Figure 1 of Adachi and the image readout-apparatus shown in Figure 2 of Adachi discloses all of the features of claim 2. However, there is simply no disclosure in Figures 1 and 2 of Adachi and

the Examiner cites to none suggesting a radiation image signal compressing means for performing compression processing on each of the radiation image signals with a first compression process, and an energy subtraction image signal compressing means for performing compression processing on the energy subtraction image signal with a second compression process, as claimed. Rather, Figures 1 and 2 of Adachi merely relates generally to the manner in which stimulable phosphor sheets (10, 11, 12, 13) are exposed to radiation in order to create digital image signals representing the masked image (30) and the live images (31, 32, 33). Col. 5, lines 1-48.

Moreover, Adachi specifically teaches away from a radiation image signal compressing means with a first compressing process and an energy subtraction image signal compressing means with a second compressing process, as required by claim 2. As described in Adachi, (Col. 7, lines 4-13) the single masked image (30) and the multiple subtraction images (31, 32, 33) are compressed in the same compressor, i.e., compressor (37) and there is no disclosure or suggestion in Adachi relating to different compressing processes. For this additional reason, Adachi does not disclose, suggest, or otherwise teach all of the features of claim 2. Applicant therefore respectfully requests the Examiner to reconsider and withdraw the § 102(b) rejection of claim 2 for this additional reason.

III. Rejection of Claims 3-6 under § 103(a) over Adachi in view of Ohara

Claims 3-6 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Adachi in view of Ohara (U.S. Patent Appln. Pub. No. 2001/0038707 A1; hereinafter “Ohara”). Applicant respectfully traverses this rejection for the following reasons.

Since claim 3 depends from claim 2, Applicant submits that claim 3 is patentable *at least* for the reasons submitted for claim 2, and because Ohara fails to make up for the deficiencies of Adachi.

Regarding claim 4, Applicant submits that claim 4 is patentable *at least* for the reasons submitted for independent claim 2 and because Ohara fails to make up for the deficiencies of Adachi. Further, Applicant submits that claim 4 is independently patentable because Adachi, Ohara or a combination thereof fails to disclose or suggest at least an energy subtraction image signal compressing means for performing compression processing on the energy subtraction image signal with a second compression process, *wherein the second compression process is an irreversible compression process*, as required by claim 4. In the Office Action, the Examiner relies on column 1, lines 40-41 of Adachi and paragraph 0223 of Ohara as teaching the features of claim 4. Contrary to the Examiner's assertion, there simply is no disclosure in Adachi and Ohara suggesting the features of claim 4.

To be precise, the cited portion of Adachi merely discloses that an irreversible compression process may be employed with an "original image signal." Col. 1, lines 40-42. Since Adachi is simply silent on the matter of compressing an energy subtraction image signal with an irreversible compression process, Adachi does not teach all of the features required by claim 4.

Similarly, Ohara fails to teach or suggest the features of claim 4. For instance, the cited portion of Ohara merely relates generally to a phase contrast radiographic image diagnosis apparatus, (*See* Fig. 16 of Ohara) which processes image data such as "phase contrast

radiographic image data.”¹ According to the disclosure of Ohara, the phase contrast radiographic image data is input to an image data inputting means (602) and “if desired” the inputted phase contrast radiographic image data is subjected to reversible compression and the data is stored in an image storing means (605). “Abnormal shadow candidate detecting means (606) detects abnormal shadow candidates upon analyzing [the] phase contrast radiographic image data” stored in the image storing means (605). (*See Fig. 16 of Ohara & paragraph 0296 of Ohara*). Given that Ohara merely teaches irreversible compression of phase contrast radiographic image data, Ohara does not disclose, suggest, or otherwise teach an energy subtraction image signal compressing means for performing compression processing on the energy subtraction image signal with a second compression process, wherein the second compression process is an irreversible compressing process, as required by claim 4.

Since neither Adachi, Ohara nor any combination thereof teaches or suggests all of the limitations of claim 4, Applicant respectfully requests the Examiner to reconsider and withdraw the § 103(a) rejection of claim 4 for this additional reason.

With respect to claim 5, Applicant submits that claim 5 is patentable *at least* for the reasons submitted for independent claim 2, and because Ohara fails to make up for the deficiencies of Adachi. Further, Applicant submits that claim 5 is independently patentable because Adachi, Ohara or a combination thereof fails to provide the motivation for an apparatus

¹ *See* paragraph 0296 of Ohara explaining that the image storing means (605) of the phase contrast radiographic image diagnosis supporting apparatus (as shown in Fig. 16 of Ohara) stores phase contrast radiographic image data.

for compressing image signals wherein the compressibility in the first compression processing process is set at 1, as required by claim 5.

In rejecting claim 5, the Examiner seems to posit that the requirement for the compressibility in the first compression process being set at 1, as recited in claim 5, is obvious because the “compressibility of a compressing process is [seen by the Office as] a design choice and is therefore unpatentable.” (*See* pg. 4 of the Office Action). Applicant respectfully submits that such “method of analysis is founded on legal error because it substitutes supposed per se rules for the particularized inquiry required by § 103. It necessarily produces erroneous results.”

In re Ochiai, 71 F.3d 1565, 1570 (Fed. Cir. 1995). In fact, in *In re Ochiai*, the Federal Circuit provided a detailed clarification of what it perceived to be a frequent misunderstanding among Examiners:

The use of per se rules, while undoubtedly less laborious than a searching comparison of the claimed invention -- including all its limitations -- with the teachings of the prior art, flouts section 103 and the fundamental case law applying it. *Per se* rules that eliminate the need for fact-specific analysis of claims and prior art may be administratively convenient for PTO examiners and the Board. Indeed, they have been sanctioned by the Board as well. *But reliance on per se rules of obviousness is legally incorrect and must cease.* Any such administrative convenience is simply inconsistent with section 103, which, according to Graham and its progeny, entitles an applicant to issuance of an otherwise proper patent *unless the PTO establishes that the invention as claimed in the application is obvious over cited prior art, based on the specific comparison of that prior art with claim limitations.* We once again hold today that our precedents do not establish any per se rules of obviousness, just as those precedents themselves expressly declined to create such rules. Any conflicts as may be perceived to exist derive from an impermissible effort to extract per se rules from decisions that disavow precisely such extraction.

In re Ochiai, 71 F.3d 1565, 1572 (Fed. Cir. 1995) (emphasis added). In view of the above, Applicant submits that the Examiner’s method of analysis was legally flawed and

contrary to the directive clearly set forth in *In re Ochiai*. Accordingly, the Examiner is respectfully requested to correct this error by considering the cited prior art of record in view of the claim limitations recited in claim 5.

Moreover, Applicant submits that claim 5 is patentable given that the cited prior art specifically teaches away from an apparatus for compressing image signals “wherein the compressibility in the first compressing process is set at 1,” as claimed. For instance, column 1, lines 34-39 of Adachi provides that “[w]hen ... image signals are stored on a storage medium or are transmitted between image signal processing apparatuses, the *signal compressibility should preferably be as high as possible* so that the required storage capacity can be reduced and the signal transmission rate can be kept high.” (emphasis added). In order to achieve this objective, Adachi teaches that the image signals representing the masked image (30) and the subtraction images (34, 35, 36) “are compressed [in compressor (37)] at a high compressibility.” (*See* Col. 2, line 9; Col. 2, line 14; Col. 3, lines 31-34; Col. 7, lines 48-49). Since Adachi teaches the desirability of compressing image signals at a “high compressibility,” a skilled artisan would not have been motivated as a matter of design choice to set the compressibility of a first compression process at 1. In other words, it would not have been obvious to one skilled in the art at the time of the present invention to set the compressibility of a first compressing process at 1, as required by claim 5.

Further, Ohara also fails to teach or suggest the features of claim 5 since the Ohara disclosure is simply silent on the matter of setting compressibility. For *at least* the above reasons, Applicant respectfully requests the Examiner to reconsider and withdraw the § 103(a) rejection of claim 5 for this additional reason.

Regarding claim 6, Applicant submits that claim 6 is patentable for the reasons submitted for independent claim 2 and because Ohara fails to make up for the deficiencies of Adachi. Since claim 6 contains features similar to the features recited in claim 5, Applicant submits that claim 6 is independently patentable for the reasons discussed above with respect to claim 5. Applicant therefore respectfully requests the Examiner to reconsider and withdraw the § 103(a) rejection of claim 6 for this additional reason.

IV. New Claims

Applicant has added new claims 7-15 in order to more fully cover various aspects of Applicant's invention as disclosed in the specification. In addition to their dependencies from claims 1, and 2, Applicant respectfully submits that claims 7-15 should be allowable because the cited prior art does not teach or suggest the limitations of these claims.

V. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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